

# PATENT SPECIFICATION



Application Date: Jan. 17, 1931. No. 1634/31.

371,406

Complete Accepted: April 18, 1932.

## COMPLETE SPECIFICATION.

### Improvements in Ice-cream Freezing-machines.

I, FREDERICK LYSTER GOLDBY, British Subject, of "Chequers", London Road, Staines, Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in apparatus for freezing ice cream mixture and extruding the frozen product continuously therefrom, of the kind in which the mixture is fed into a revolving can mounted in a cooling-box, agitating means being mounted on a dasher shaft extending through the can, which shaft revolves in the opposite direction to that of the can, one end of the shaft forming a conveying screw extending into a discharge nozzle.

The present invention is directed to the dasher shaft component in the rotating can, and also to the delivery end of the said rotating can.

One object of the present invention is to provide agitating means in the revolving can by which an efficient feeding of the mixture through the can is ensured. Another object is to provide facilities whereby the rate of progress of the feeding of the mixture may be regulated.

It has been found in practice that the agitating blades of the dasher shaft when of T-shape are liable to fracture in use particularly at the web portions, and another object of the present invention is to provide an improved construction of agitating blade which is noted for its sturdiness in build and its capability of standing up to the work. A further object is to provide an improved form of adjustable agitating blade by which the means for setting is not liable to become unstable or loose in use as is the case with known adjustable setting means. A still further object is to provide a simple controlled delivery for the frozen product.

According to the present invention there is provided in apparatus of the kind referred to, the combination of radially set blades on the feed end of the dasher shaft for imparting an initial movement to the mixture, a plurality of agitating blades of frame-like form mounted in

spaced relationship along the dasher shaft the whole of the blades being so twisted and arranged with respect to one another as to form an interrupted helical-blade feed conveyer, and a conveying screw for delivering the frozen product from the delivery end of the can to an outlet.

The agitating blades may have means for varying the propulsive effect thereof.

Means may be provided for adjusting the scraping edges of the agitating blades.

Other features embodied in the apparatus according to the present invention are indicated in the description and claims.

The accompanying drawings illustrate by way of examples various constructions made according to the present invention.

In the drawings:—

Fig. 1 is a section through the rotating can and delivery outlet, Fig. 2 a perspective sectional view thereof. Fig. 3 is a view showing various forms of agitating blades. Figs. 4 and 5 show an adjustable form of agitating blade or beater, while Figs. 6, 7 and 8, are front, side, and perspective views respectively of another form of blade or beater. Fig. 9 is a view of the pump for the cream, and Fig. 10 a sectional view of a modified form of delivery screw.

The rotating can 1 has mounted therein a dasher shaft 2 on which are mounted the agitating blades or beaters.

Now referring to Figs. 1 and 2 there is provided at the feed end four blades 3 serving as an initial propeller for the mixture. These blades have peripheral working surfaces 3a. Each peripheral working surface is of less width than the overall width of the blade itself, and the blades are so designed and related to one another that one part 3b of the end of the blade in each of the four scrapes substantially one quarter of the inner end of the can.

The peripheral working surfaces 3a may be of various widths as shown in Figs. 1 and 2 of the drawings.

The four blades are so arranged and twisted that they form a fifth part of an interrupted helical blade feed conveyer,

which is completed by the arrangement of beaters or agitating blades extending from the blades 3 to the outlet of the can.

These beaters or agitating blades 4 are mounted on the shaft 2 and as stated extend from the blades 3 to the delivery end of the can. These blades 4 are of sturdy construction and in the form of rectangular frame-like units twisted so as to form with the blades 3 one long helical-blade conveyer which gradually feeds or pushes the mixture towards the delivery end.

The action and speed of propulsion of these blades 4 may be varied by the insertion of grids or perforated plates 5 (Fig. 3) thus giving various degrees of motion or slip according to the size and number of holes or passages in the grids or plates.

Fig. 2 shows in perspective the arrangement of the blades whereby the continuity of travel of the mixture from the inlet to the outlet is carried out.

6 indicate a number of dog couplings for connecting the various blades, the blades 3 and 4 sliding over the main shaft 2 when assembling.

A plate or disc 7 around which the product is delivered to the delivery side is mounted on the shaft 2 adjacent the delivery end or outlet of the can. 8 is a discharge or conveying screw which delivers the frozen product from the can to an outlet 9. This outlet is controlled by a mushroom valve 10. The valve 10 is actuated by a hand-wheel 11. The valve is locked in any position by a locking ring or wheel 12.

The conveying screw in Figs. 1 and 2 is a continuation of the dasher shaft, while in Fig. 10 it is a separate component mounted at one end in the dasher shaft and at the other end in the valve. In Figs. 1 and 2 the removable end 1a of the freezing can forms a long bearing for the screw.

Fig. 3 shows at *x* solid forms of propeller blades, and at *y* a frame-like agitating blade of triangular form. The blades *x* give the initial movement to the mixture as it enters the can. The frame-like agitating blade *y* does not serve as a propeller, but with it there is embodied the feature of an adjustable scraper. This blade *y* may be cast in one-piece or assembled from components.

Still referring to Fig. 3, the propeller type agitator shown at 4 has a perforated grid 5 screwed into a rebate formed at the inner edge of the frame 4. The holes or channels in these grids may be of varying sizes. The grids or perforated plates may be made up of multiple sliding components so arranged that the size of the

perforations, holes or channels may be varied.

As shown in Figs. 3 and 4, the blades may have and preferably do have an adjustable scraping edge for working against the inside of the can. This scraper component in one form consists of a plate 10 having an inclined slot 11 in which are located screws 13 attached to the frame 4 for holding the plate to the frame.

The provision of the screws and inclined slot connection between the two parts allows of the scraper component being set in proper working co-operation with the internal wall of the can. Also it provides for a re-setting due to wear or other causes.

Fig. 5 shows an arrangement for holding the scraper component against movement, teeth 14 being provided on the face thereof, these teeth meshing with teeth provided on the face of the agitator 4. This form of scraper does not possess the adjustable feature.

Another way of adjusting the plate 10 is as also indicated in Figs. 3 and 4, in which lugs 20 on the frame 4 have screws 21 working therethrough and on which the plate 10 rests, suitable means being provided for holding the plate 10 to the frame 4, so that the plate can move relatively to the frame.

The dasher shaft 2 is of known construction, and the mixture enters the can 1 from the hollow part of the said shaft through an opening 22 (see Fig. 3).

Fig. 4 shows a typical propeller like twist given to the agitators.

As shown in Fig. 3 there may be provided what may be termed a jig or guide 30 to retain the dasher shaft in a central position relatively to the can 1, when the end 1a is removed.

Figs. 6, 7 and 8 show an initial form of propeller somewhat comparable to a flat or broad bladed propeller, one end 31 being arranged to scrape the end wall of the can as shown in Fig. 7.

Fig. 9 shows at 32 a pump of any suitable form for feeding the cream to the can 1, air being admitted to the cream after it leaves the pump, for example at a suitable part of the inlet system indicated by 33.

As shown in Fig. 10 the conveying screw 8 may be withdrawn from the apparatus by removing the valve parts.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In apparatus of the kind referred to, the combination of radially set blades at

dasher shaft for immersion to the mixing blades of the shaft, the whole being so twisted and set to one another as to form a helical blade feed conveying screw for delivering the product from the can to an outlet, substantially as described.

The kind referred to, the agitating blades for the purpose thereof.

According to claim 2, in which the blades have perforations for varying the pressure.

According to any of the claims in which each agitating blade has a scraping edge and a screw and inclined blade.

According to any of the claims to 3, in which each blade has an adjustable scraping edge and setting means.

According to any of the claims substantially as described.

According to any of the claims having the conveying means on the dasher shaft.

According to any of the claims having an initial feed substantially as described.

According to any of the claims having an outlet mushroom valve and a setting

9. Apparatus according to any of the preceding claims, having a jig or guide device for the dasher shaft for the purpose described.

10. Apparatus for freezing ice cream mixture and extruding a frozen product continuously from a rotating can mounted in a cooling box and fitted with an oppositely rotating dasher shaft, comprising a pump for feeding the cream into the can, an air inlet intermediate of the pump and the freezer can, blades mounted on the dasher shaft for initially propelling the mixture in the can, a plurality of agitating blades of frame-like form mounted in spaced relationship along the dasher shaft, the whole of the blades being so arranged as to form an interrupted helical blade feed conveyer, a conveyer screw for delivering the frozen product from the can to an outlet, and a mushroom valve control for said outlet.

11. In apparatus according to the preceding claims, an agitating blade made up in triangular form with an adjustable scraping edge.

12. Apparatus for freezing ice-cream mixture and extruding a frozen product continuously from a rotating can mounted in a cooling box, constructed and arranged substantially as described with reference to the accompanying drawings.

Dated this 17th day of January, 1931.

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Liverpool Street, London, E.C.2,  
Patent Agents for the Applicant.

Fig. 1.

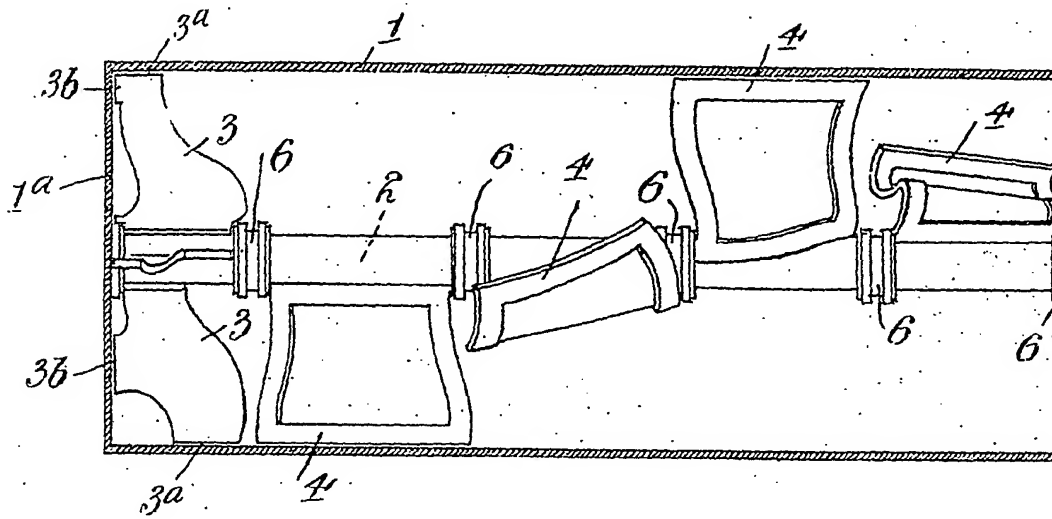


Fig. 9.

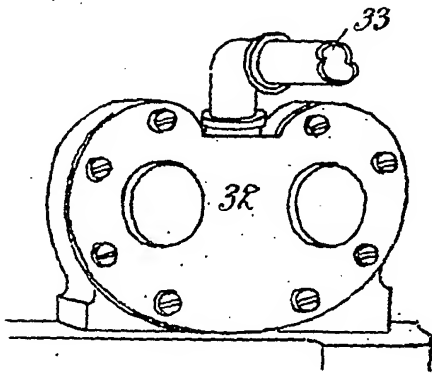
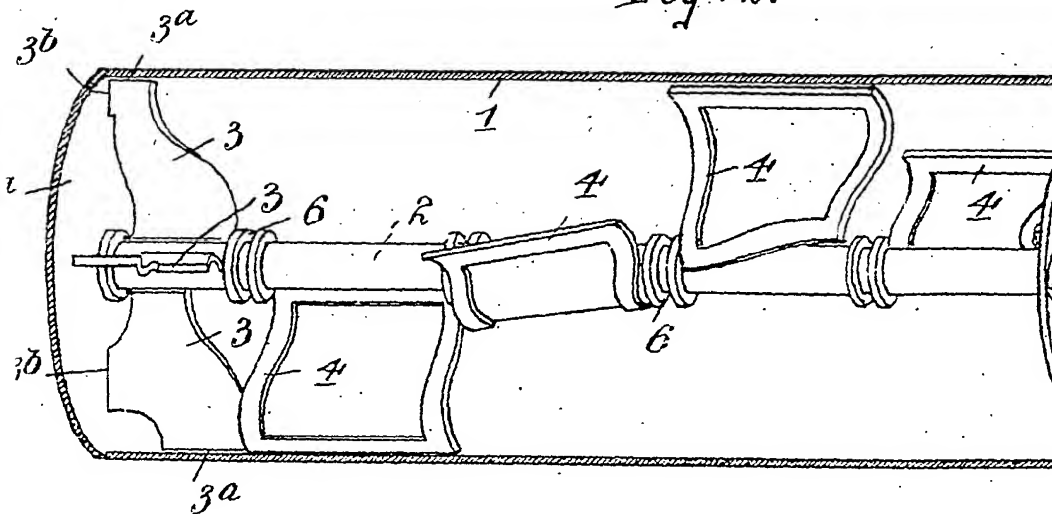


Fig. 2.



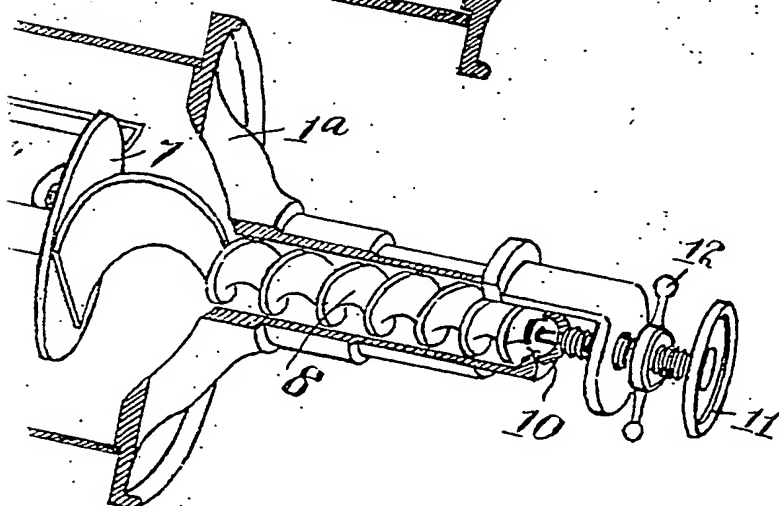
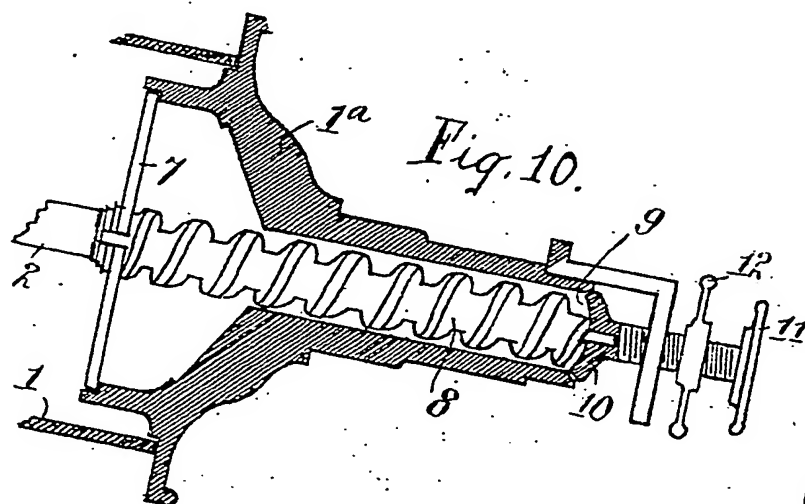
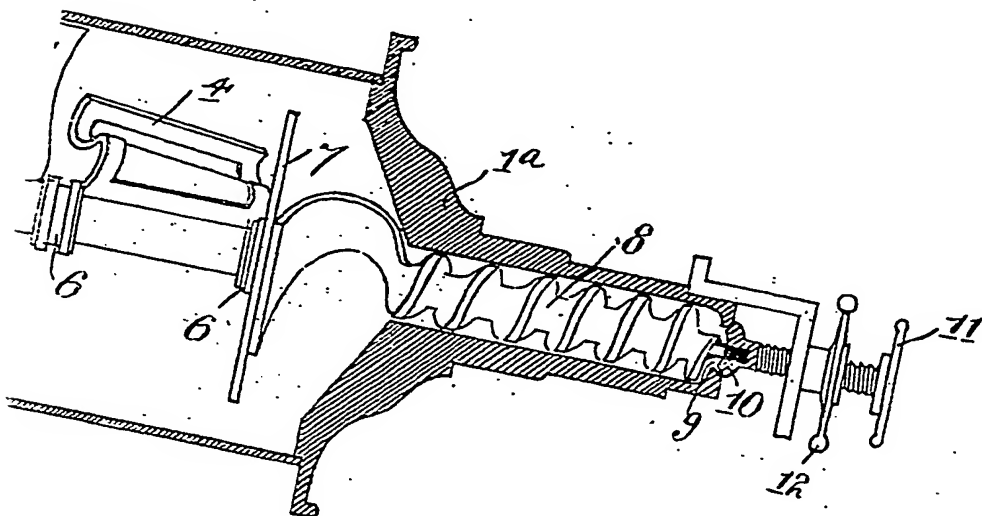


Fig. 1.

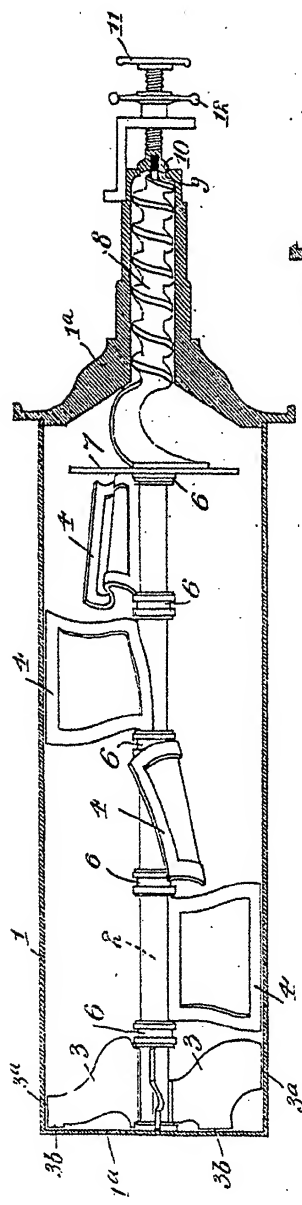


Fig. 9.

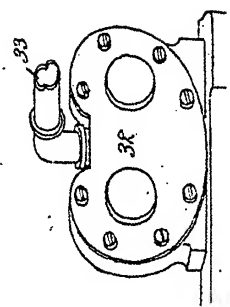
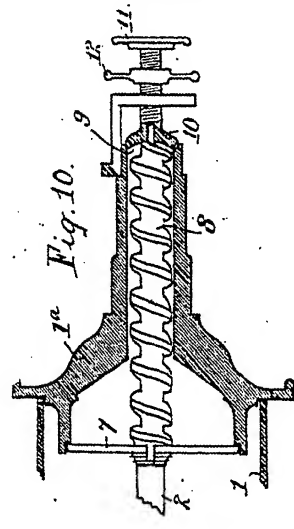
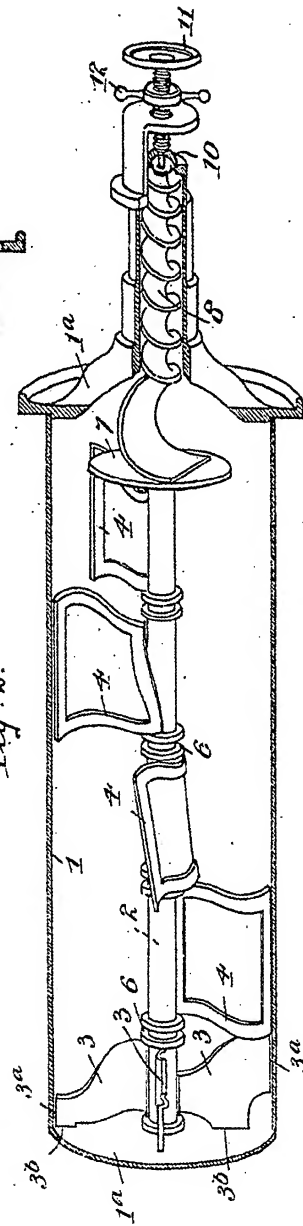
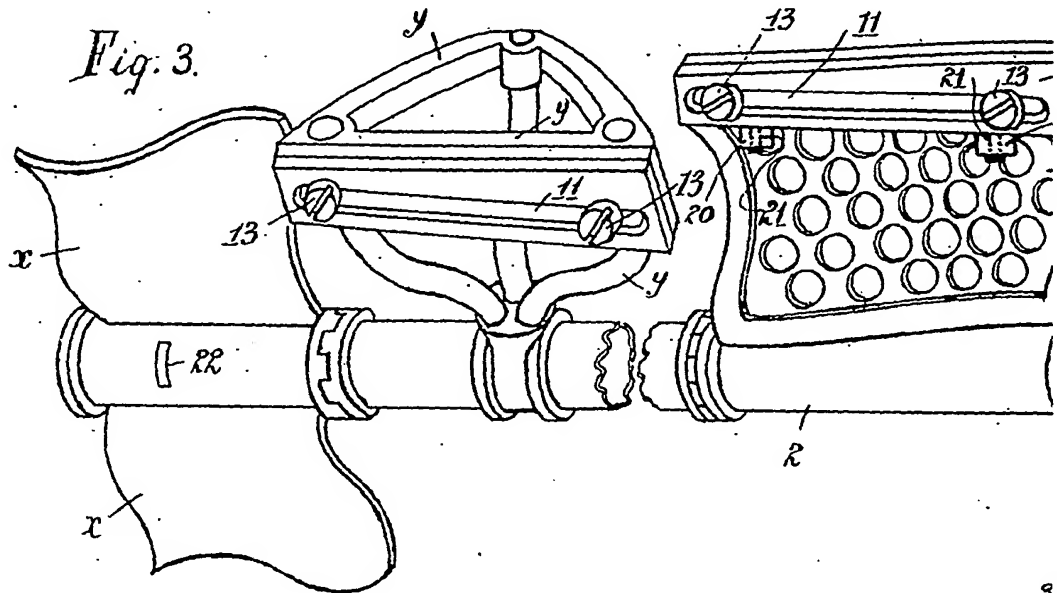


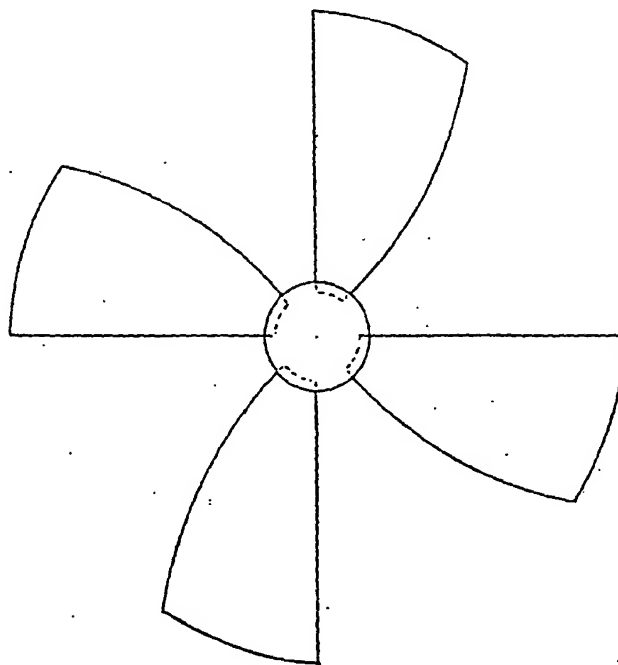
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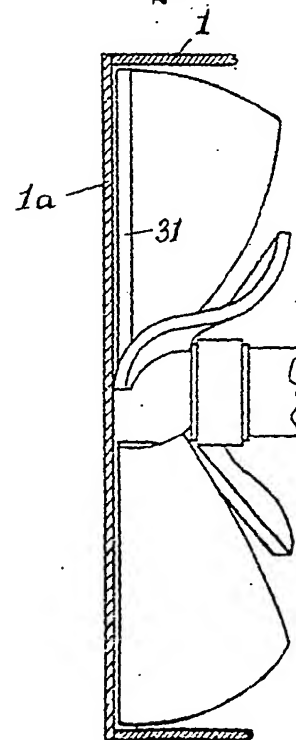
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*Fig. 6.*



*Fig. 7.*



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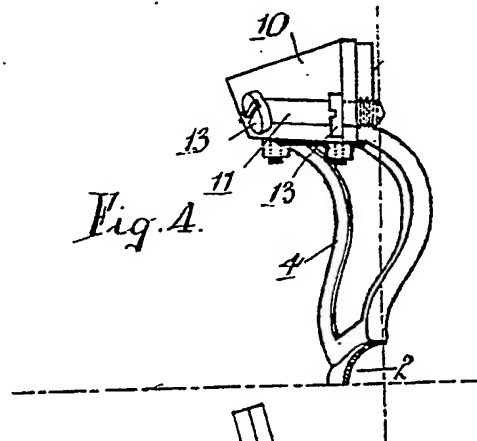
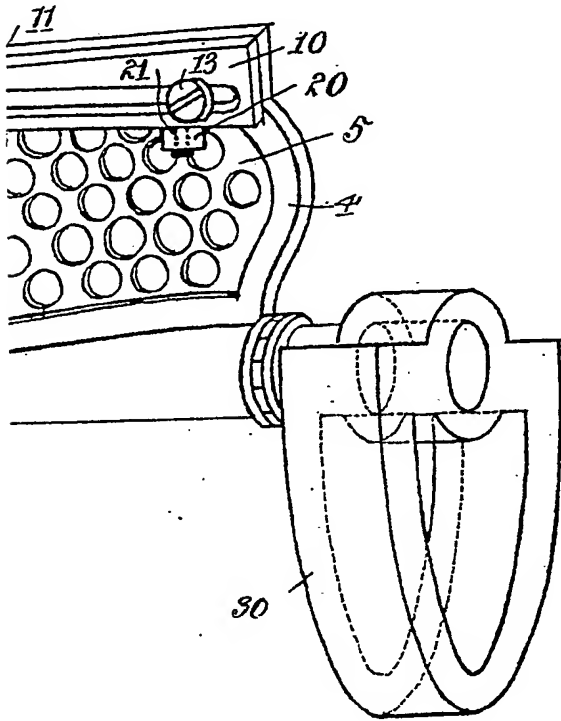


Fig. 5.

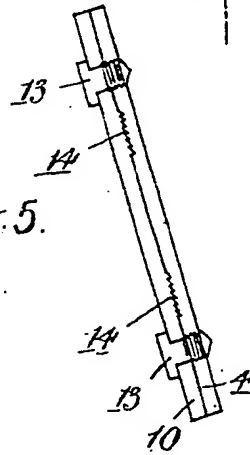
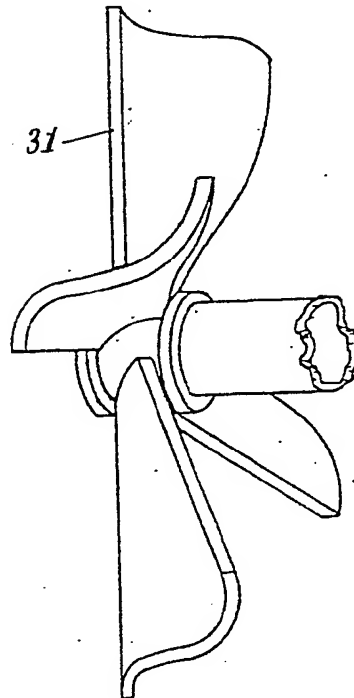
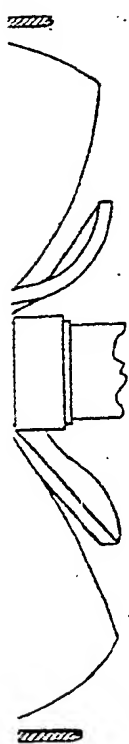


Fig. 8.

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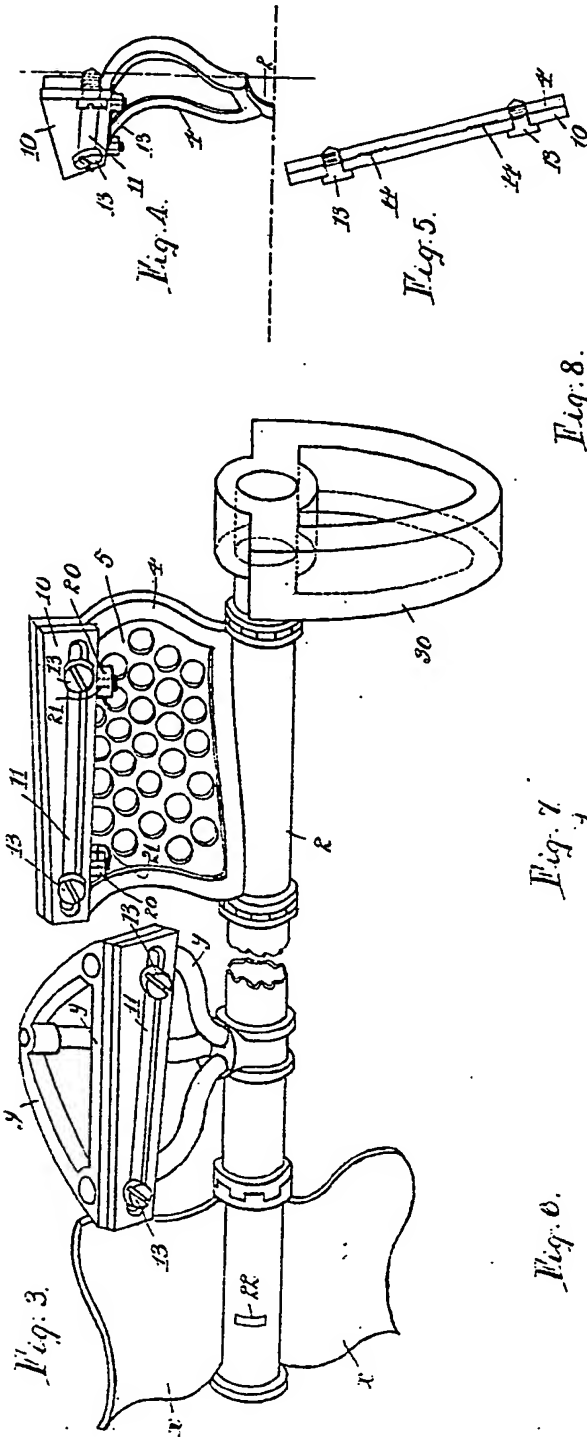


Fig. 6.

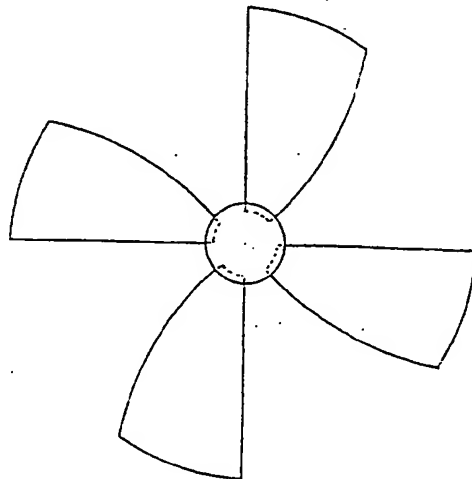


Fig. 7.

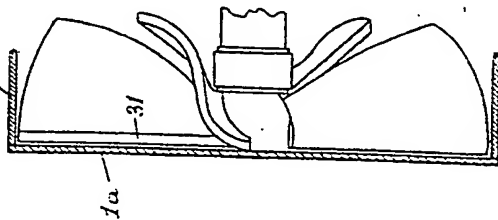
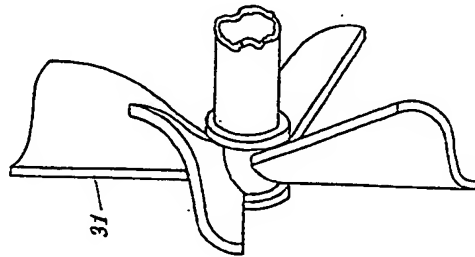


Fig. 8.



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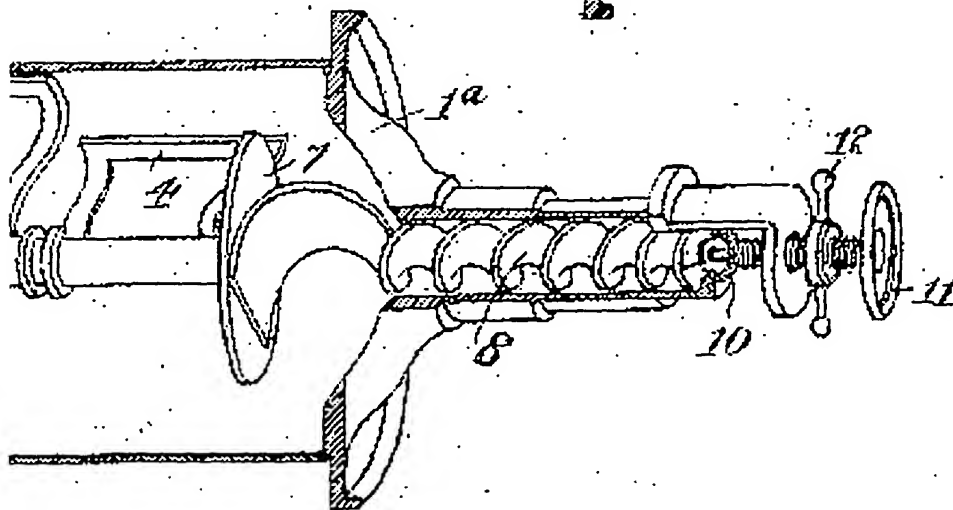
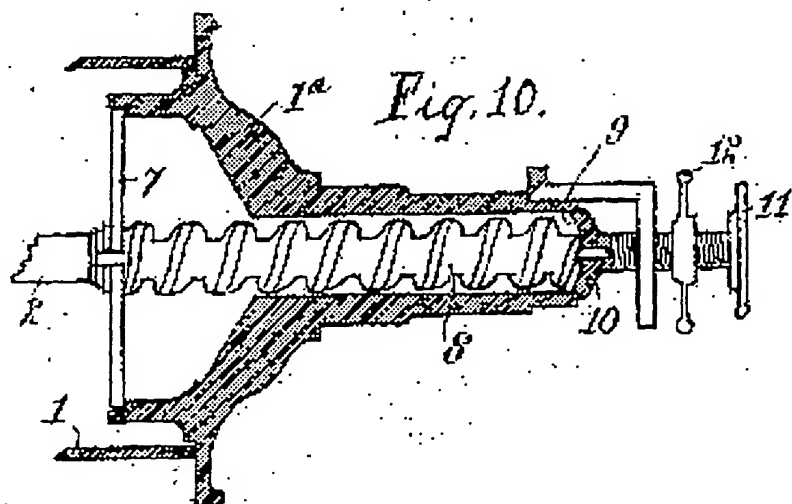
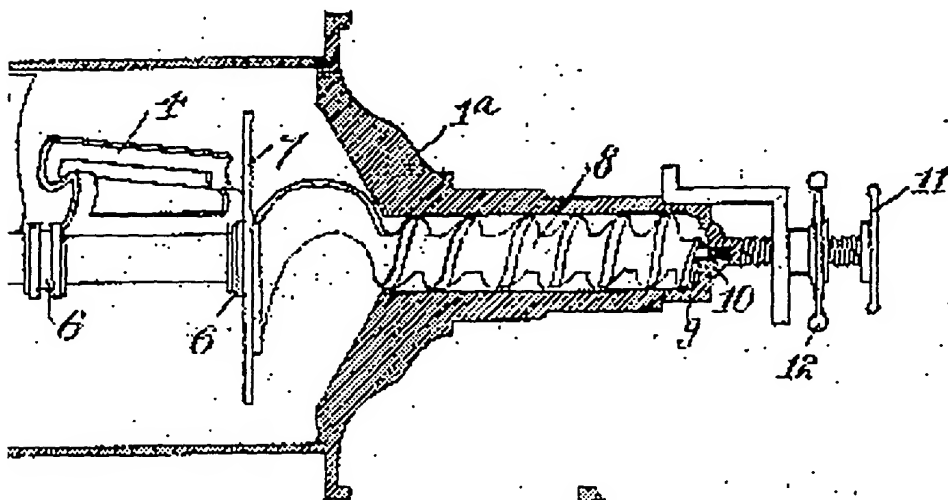


Fig. 1.

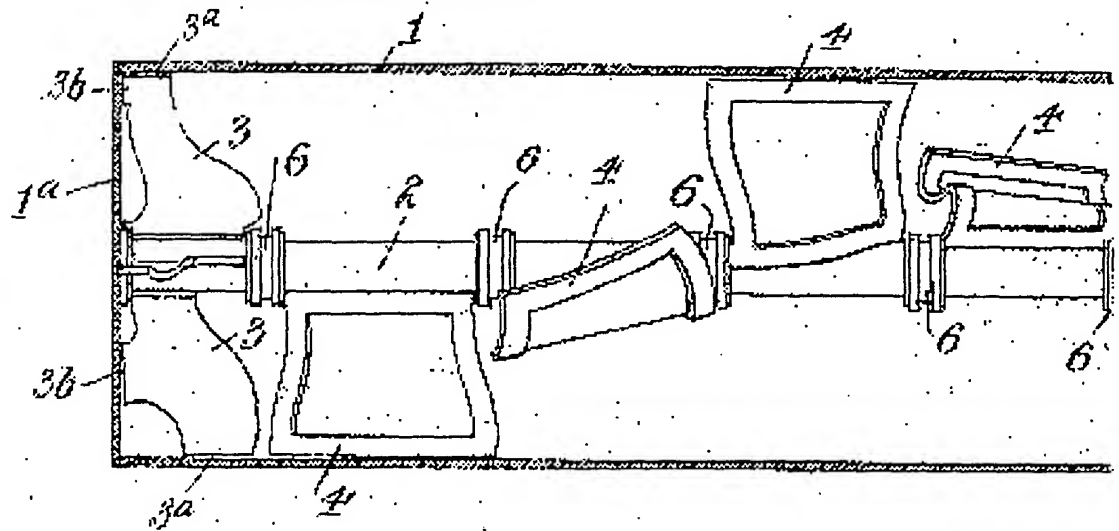


Fig. 9.

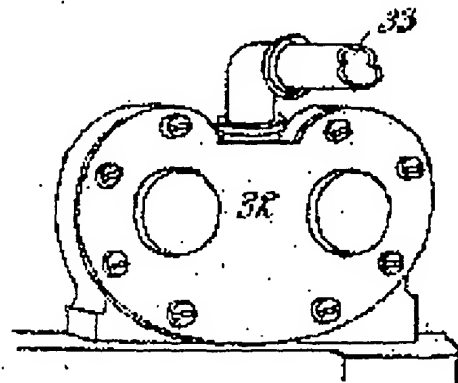
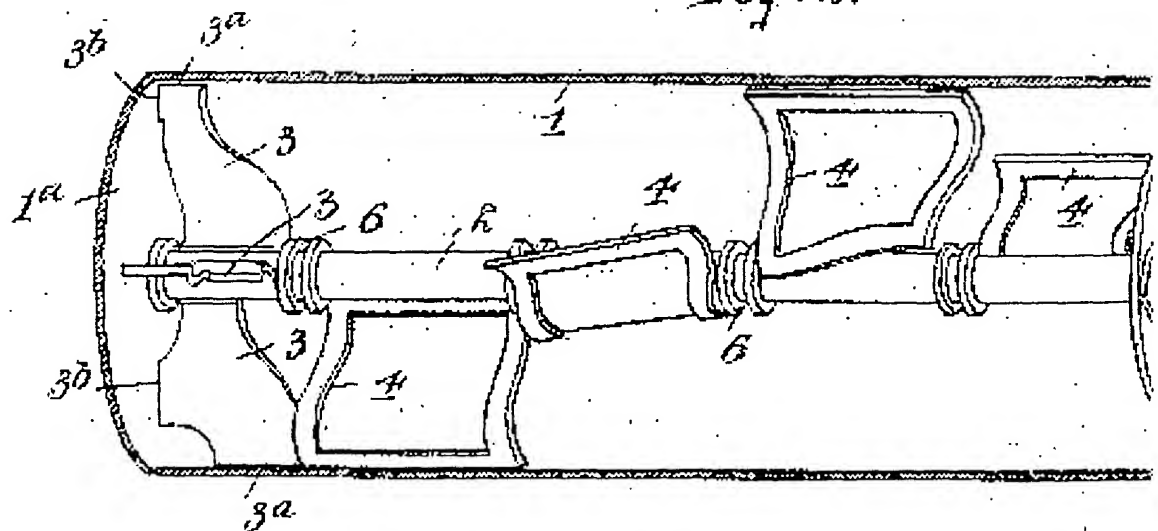


Fig. 2.



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Fig. 1.

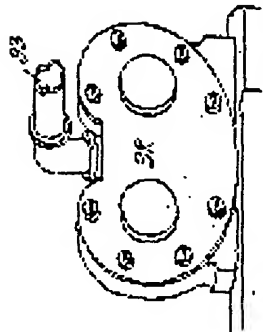
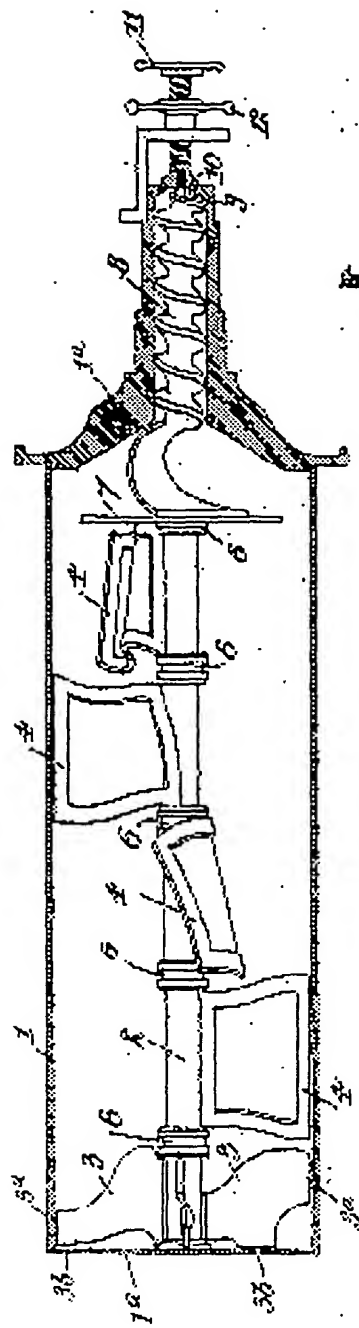


Fig. 9.

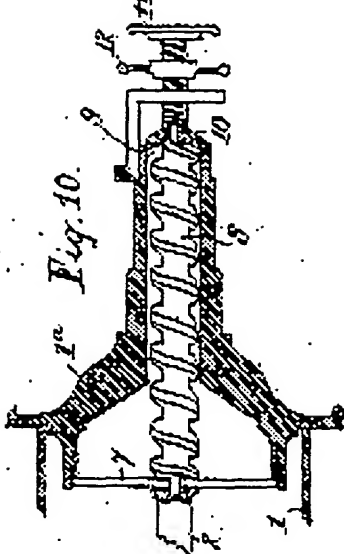
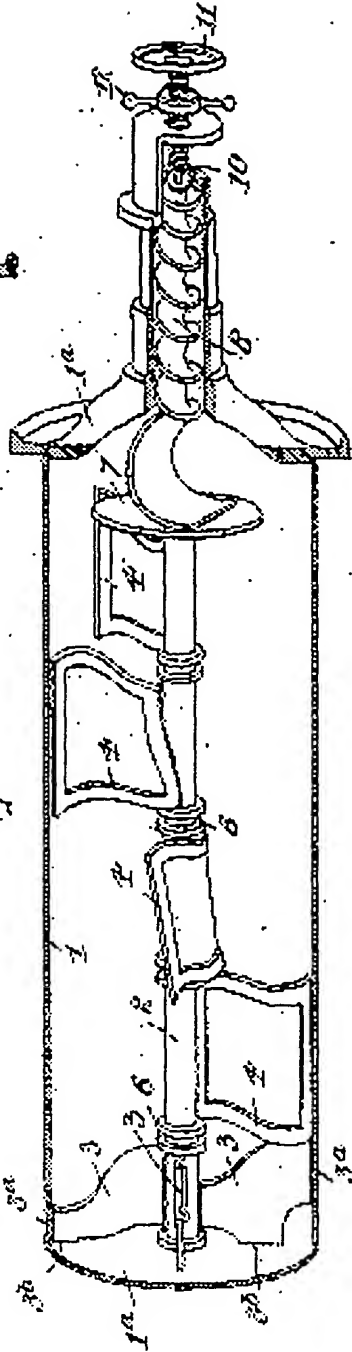
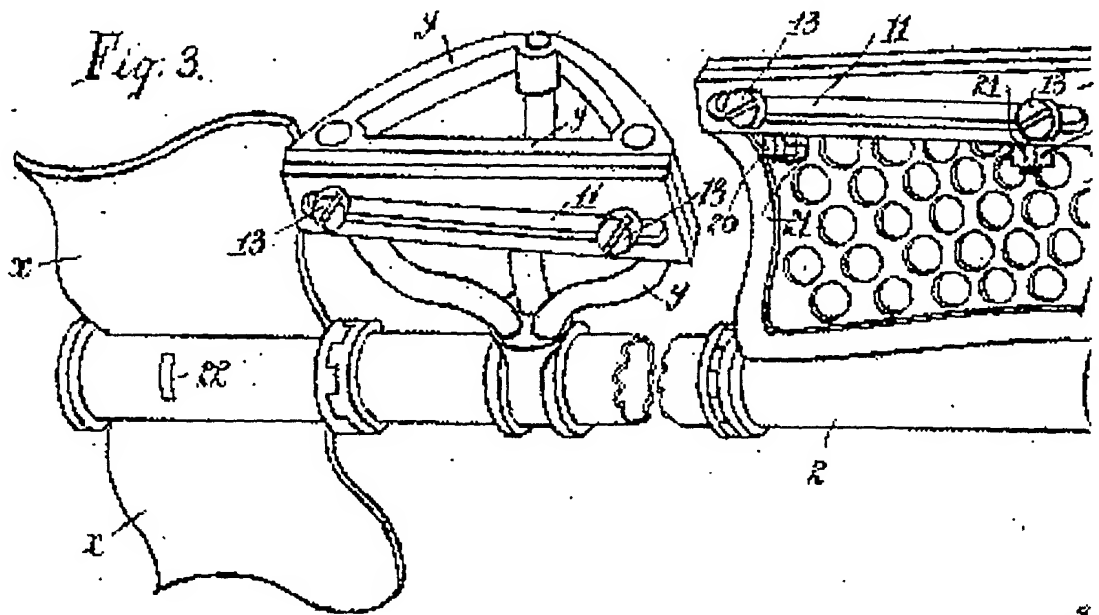


Fig. 10.

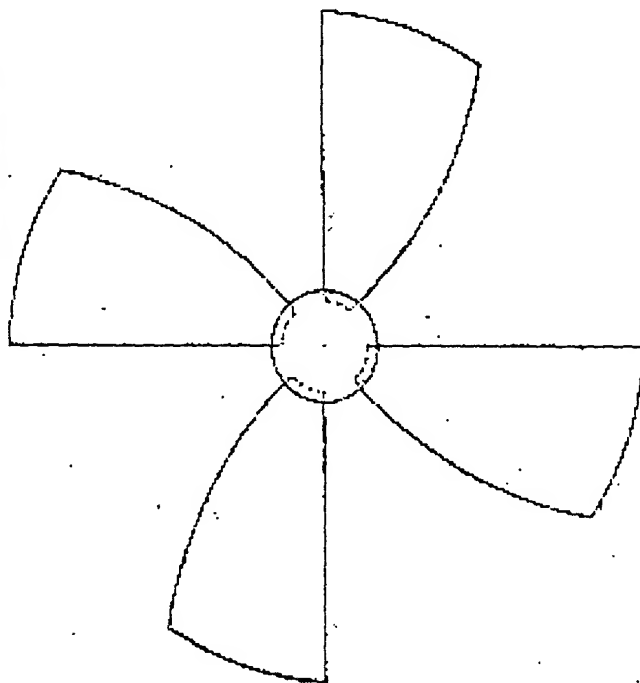
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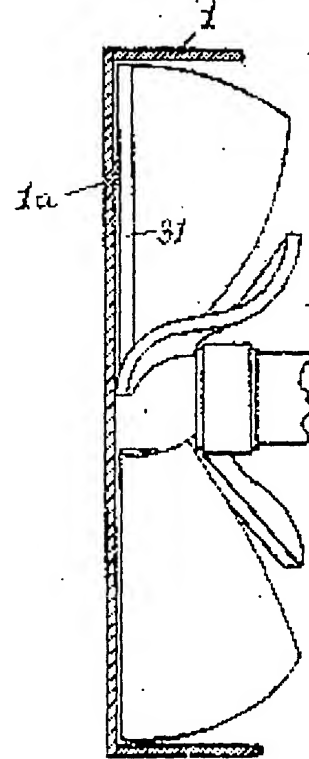
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*Fig. 6.*



*Fig. 7.*



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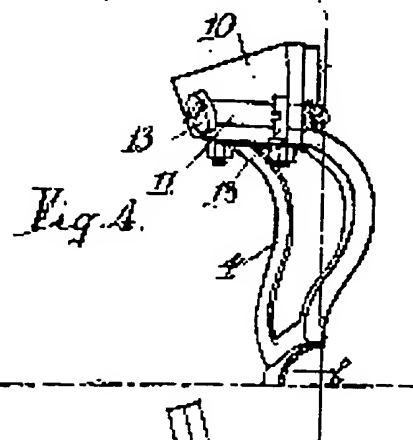
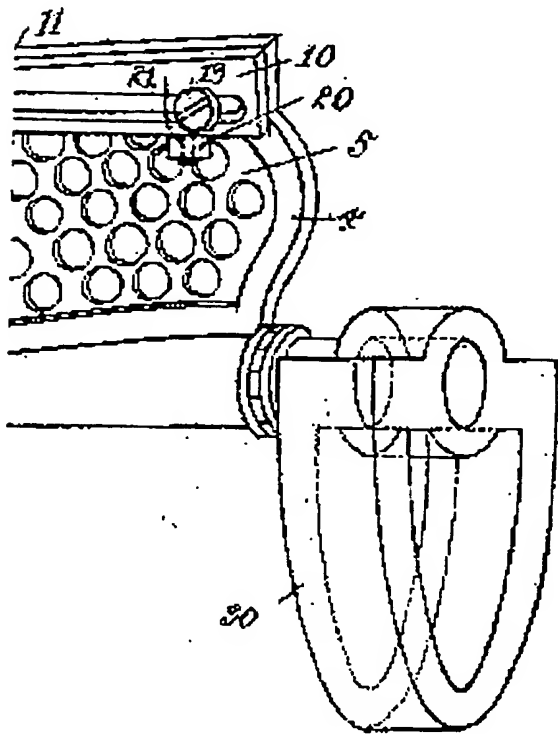


Fig. 5.

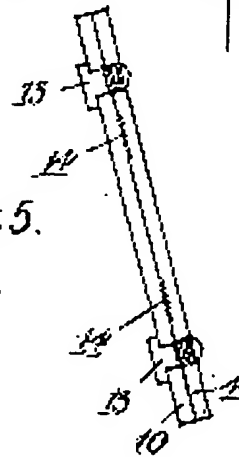
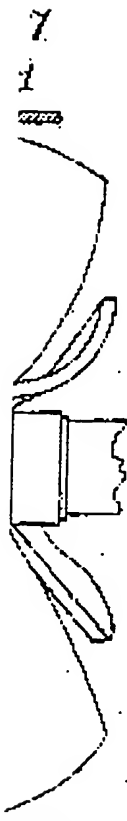
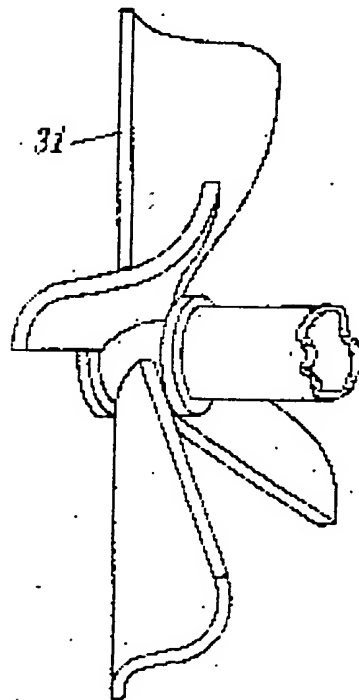


Fig. 8.



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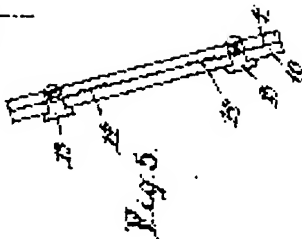
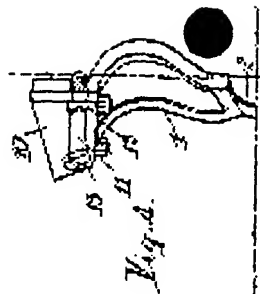
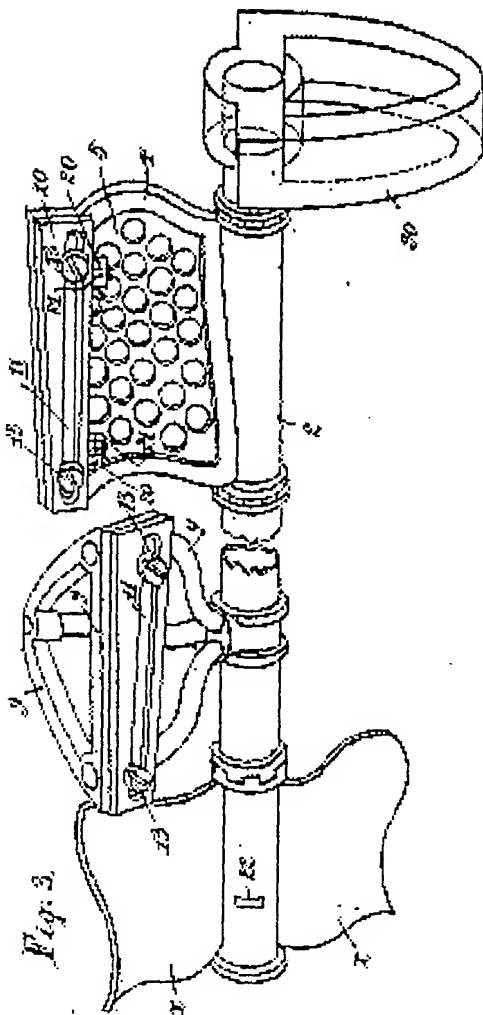


Fig. 6.

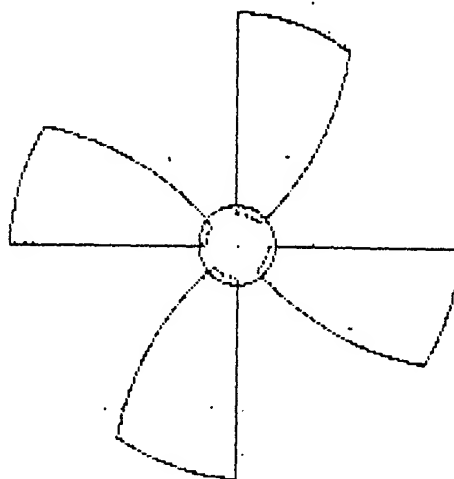


Fig. 7.

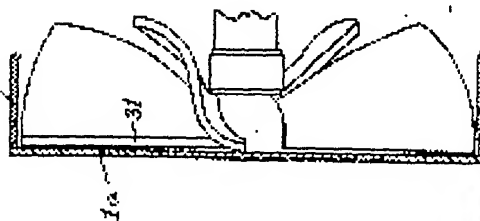
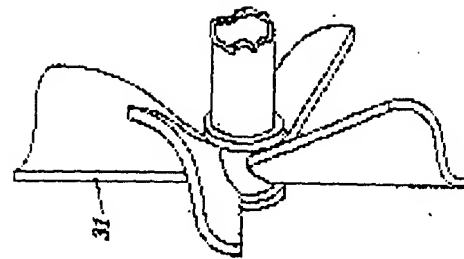


Fig. 8.



Charles F. Reed and Ralph Reed